

A REVIEW OF *EUPHORBIA* (EUPHORBIACEAE) IN BAJA CALIFORNIA¹

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ABSTRACT

Study of the available collections from Baja California reveals that there are at least 13 species of *Euphorbia* (excluding *Chamaesyce*) there. *Euphorbia chersonesa* Huft, *E. lagunensis* Huft, and *E. pumicicola* Huft are described as new, *E. ceroderma* I. M. Johnston and *E. cyathophora* Murr. are reported from Baja California for the first time, and *E. humayensis* Brandege, reported from Baja California when it was described, but omitted in the recent "Flora of Baja California," is reinstated. The taxonomy of subgenus *Poinsettia* is updated, and a key to all Baja California species of *Euphorbia* is provided.

In the recent "Flora of Baja California" (Wiggins, 1980), seven species of *Euphorbia* are recognized (excluding the 26 species of subg. *Chamaesyce* Raf., which I recognize as the genus *Chamaesyce* S. F. Gray, and which will not be further considered here). These are distributed among three subgenera, *Agaloma* (Raf.) House, *Esula* Pers., and *Poinsettia* (Graham) House. An examination of the available herbarium material shows that there are actually 13 species of *Euphorbia* in Baja California. Of the six additions reported here, two are species of western Mexico reported from Baja California for the first time,

one was cited from Baja California when it was published but was not included in the Flora, two are described as new, and one was previously recognized as a variety of *E. heterophylla* L., a species to which it has no close relationship, and is here described as a new species. In addition, the treatment of subg. *Poinsettia* is updated to take into account the work by Dressler (1961) that cleared up much previous confusion in that group.

The following key will distinguish the species of *Euphorbia* now known from Baja California.

1. Glands of the involucre cup-like or bilabiate, usually 1 or 2 (3-5 in *E. pumicicola*) (subg. *Poinsettia*).
2. Glands bilabiate.
 3. Bracts usually red at base; gland usually 1 per cyathium; seeds cylindrical, sharply tuberculate 1. *E. cyathophora* Murr.
 3. Bracts green or white at base; glands 3-5 per cyathium; seeds ovoid, angular, the tubercles low and blunt 2. *E. pumicicola* Huft
2. Glands with circular opening, usually 1 per cyathium; bracts green, pale, or purple-spotted at base, never red; seeds ovoid, angular, coarsely tuberculate 3. *E. heterophylla* L.
1. Glands of the involucre flat or shallowly concave, usually 4 or 5.
 4. Glands appendiculate (appendages nearly obsolete in *E. chersonesa*); stipules minute, glanduliform; seeds ecarunculate (except in *E. eriantha*) (subg. *Agaloma*).
 5. Plants annual.
 6. Involucres and capsules glabrous; herbage glandular-pubescent; leaves alternate; appendages green, unlobed, ample 4. *E. humayensis* Brandege
 6. Involucres and capsules pubescent; herbage not glandular; leaves alternate or opposite; appendages white or green, lobed, divided, or nearly obsolete.
 7. Appendages nearly obsolete; leaves alternate; seeds coarsely tuberculate 5. *E. chersonesa* Huft
 7. Appendages lobed or divided; leaves mostly opposite; seeds shallowly pitted or smooth and 4-angled.
 8. Plant delicate; appendages 3-lobed, green, spreading; seeds shallowly and coarsely pitted, ecarunculate; capsules broader than long, densely tomentose on the angles, otherwise glabrous 6. *E. lagunensis* Huft

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8. Plant robust; appendages 5–10-fid, white, arching over the glands; seeds smooth, 4-angled, carunculate; capsules longer than wide, densely white-tomentose all over 7. *E. eriantha* Benth.
5. Plants shrubs or leafless wax-coated perennials.
9. Leaves scale-like or lacking; stems in dense clumps, erect, covered with a thick wax coat 8. *E. ceroderma* I. M. Johnst.
9. Leaves fully formed; stems woody, highly-branched.
10. Leaves verticillate; cyathia disposed in cymes 9. *E. xantii* Engelm. ex Boiss.
10. Leaves alternate; cyathia occurring singly in axils of leaves.
11. Herbage, involucre, and ovary pubescent 10. *E. misera* Benth.
11. Herbage, involucre, and ovary glabrous.
12. Petioles very slender, ca. 0.4 mm diam. or less, equalling or exceeding blade in length; leaf blade thin, dark green 11a. *E. californica* Benth. var. *californica*
12. Petioles stouter, ca. 0.5–1 mm diam., shorter than blade; leaf blade thick, leathery, pale yellowish green 11b. *E. californica* var. *hindsii* (Benth.) Wigg.
4. Glands exappendiculate; stipules lacking; seeds carunculate (subg. *Esula*).
13. Plant annual; glands elliptic, lacking horns; capsules verrucose; seeds reticulate 12. *E. spathulata* Lam.
13. Plant perennial; glands with 2 short horns; capsules smooth; seeds pitted 13. *E. palmeri* Engelm.

SUBGENUS *POINSETTIA* (GRAHAM) HOUSE

1. *Euphorbia cyathophora* Murr., Comm. Götting. 7: 81. 1786.

This species is here reported from Baja California for the first time. It is the common weedy poinsettia of the eastern and central United States with red-based bracts and is also common in Mexico and Central America. It is often confused with the widespread tropical weed, *E. heterophylla*, but the two species are quite distinct, as was first clearly pointed out by Dressler (1961).

Specimens examined. MEXICO. BAJA CALIFORNIA SUR: Sierra San Lázaro, 10 Oct. 1893, *Brandege* s.n. (NY, UC); San Bernardo, 13 Oct. 1893, *Brandege* s.n. (UC).

2. *Euphorbia pumicicola* Huft, sp. nov. TYPE: Mexico. Baja California Sur: ca. 5 mi. N of Comondú, ca. 2,000 ft., 3 Oct. 1941, *Hammerly 175* (holotype, DS 293876, photograph at F—neg. no. 58289; isotype, CAS), distributed as *E. heterophylla* L. sensu latior.

Herba annua, glabra. Folia opposita, obovata, infra mediam leviter lobata, supra mediam serrata; stipulae obsoletae. Inflorescentia terminalis, compacta, cymosa; bracteae similes foliis caulinis, prope basin interdum discolores. Cyathia 2–2.7 mm alta, orificio 1.7–1.8 mm diam.; lobi 5, laciniati, excedentes glandulas; glandulae 3–5, exappendiculatae, bilabiatae. Flores masculae ca. 10; bracteolae obsoletae; styli 3, ca. 1 mm longi, indivisi vel parum furcati. Capsula ovoidea-deltoida vel subglobosa. Semina ovoidea-angulata, ecarunculata, tuberculis humilibus obtusis.

Erect taprooted annual, 15–20 cm high, glabrous, sparsely branched. Stem 1.8–2.5 mm diam. at base. Leaves opposite, 2–4 pairs, the upper

ones crowded below the inflorescence, the lowest ones above the middle of the stem; petiole slender, 1–1.5 cm long; blade obovate, green, shallowly lobed below the middle, serrate above the middle, 2–3.5(–4) cm long, 1–1.6 cm wide; base cuneate; apex obtuse to acute; stipules lacking. *Inflorescence* a compact terminal cyme; bracts similar to stem leaves but smaller, to 1.5 cm long, green, often white or pale toward base. *Cyathia* campanulate, green, 2–2.7 mm high, 1.7–1.8 mm diam. at orifice; lobes 5, 0.5–0.7 mm long, exceeding the glands, laciniate, white toward apex; glands 3–5, 0.2–0.3 mm high, ca. 0.5 mm wide, bilabiate, exappendiculate. *Staminate* flowers ca. 10; bracteoles lacking. *Styles* 3, ca. 1 mm long, undivided or very slightly bifid; gynophore exerted from the cyathium 1.5–3 mm, nutant. *Capsule* ovoid-deltoid to subglobose, 2.5–3.5 mm high, 3–4.5 mm diam., green; seeds truncate-ovoid, 2–2.3 mm long, 2–2.3 mm diam., angular, bluntly pointed at hilar end, covered with low blunt tubercles, ecarunculate, brown.

Euphorbia pumicicola may be distinguished from the other annual species of subg. *Poinsettia* by the combination of a glabrous plant body, opposite leaves, 3–5 bilabiate glands per cyathium, and angular, bluntly tuberculate seeds. In its small stature and possession of more than one gland per cyathium it is reminiscent of *E. inornata* (Dressler) A. Radcliffe-Smith of Peru, but that species differs by its more spreading habit, alternate phyllotaxy, nearly entire leaves, and more nearly smooth seeds.

Euphorbia pumicicola is known only from the type, which was collected on a plateau thickly strewn with lava rocks (whence the name). A

more extended description of the habitat with a list of associated species is given by Johnson (1958: 235–236).

3. *Euphorbia heterophylla* L., Sp. Pl. 453. 1753.

Although Wiggins (1980) recognized three varieties of *E. heterophylla*, including the typical variety, there is no consistent basis for the recognition of infraspecific taxa. *Euphorbia heterophylla* var. *graminifolia* Engelm. is the most commonly recognized variety, based on a specimen of *E. cyathophora* with narrow leaves. Both *E. heterophylla* and *E. cyathophora* exhibit a wide range of leaf shapes, none of which have any geographical integrity or any correlation with other characters. It is worth pointing out that although the varietal name is often cited as *E. heterophylla* var. *graminifolia* (Michx.) Engelm. (e.g., in Fernald, 1950; Macbride, 1951; Radford et al., 1968; Standley & Steyermark, 1949; Wiggins, 1980), presumably based upon *E. graminifolia* Michx. (which is typified by another narrow-leaved specimen of *E. cyathophora*), Engelmann in fact named a new variety without reference to Michaux's name.

The other heterotypic variety recognized by Wiggins is *E. heterophylla* var. *eriocarpa* Millsp. The type specimen of this name does not even belong to subg. *Poinsettia*, as was pointed out by Dressler (1961), but rather represents an otherwise undescribed species of subg. *Agaloma* and is described below (*E. chersonesa*).

Euphorbia heterophylla, which is such an aggressive weed elsewhere in its range, does not seem to be very common in Baja California, and apparently occurs only in the southern quarter of the peninsula.

Specimens examined. MEXICO. BAJA CALIFORNIA SUR: Miraflores, 13 Oct. 1890, *Brandegge* 517 (UC-2; 3 other sheets of this number, but collected nine and 11 days earlier, are *E. chersonesa*); San Bernardo, 13 Oct. 1893, *Brandegge* s.n. (UC); Cape region, Nov. 1902, *Brandegge* s.n. (UC); Sierra de la Giganta, Mesa del Potrero de San Javier (NE of Misión San Javier), ca. 25°52'N, 111°32½'W, ca. 800–850 m, 19 Sept. 1965, *Carter* 4967 (UC); Sierra de la Giganta, W-facing mesa-like slope of Cerro Gabilán, ca. 25°50½'N, 111°24½'W, ca. 1,200 m, 4 Oct. 1965, *Carter* 5108 (UC); Sierra de la Giganta, N slope above cliffs near summit, Cerro del Barreno, S side of Valle de los Encinos (S side of Cerro Giganta), ca. 26°03'N, 111°35'W, ca. 1,260 m, 30 Sept. 1967, *Carter & Moran* 5341 (UC); Sierra de la Giganta, N- and NW-facing slopes S of Puertezuela de Última Agua (crest of the Sierra de la Giganta NW of Puerto Escondido), ca. 25°50'N, 111°23'W, ca. 875–960 m, 5 Oct. 1970, *Carter & Moran* 5539 (UC); Mts.

W of Boca de la Sierra, near 23°23'N, 109°49'W, 390 m, 30 Sept. 1967, *Howe* s.n. (SD); San José del Cabo, 1 Apr. 1930, *Johansen* 507 (DS); Borrego Ranch, 20 Sept. 1930, *Jones* s.n. (DS); Primer Agua, near Loreto, 19 Oct. 1930, *Jones* s.n. (UC).

SUBGENUS *AGALOMA* (RAF.) HOUSE

4. *Euphorbia chersonesa* Huft, sp. nov. TYPE: Mexico. Baja California Sur: ca. 1.5 mi. S of Mission Dolores landing, near 25°05'N, 110°54'W, ca. 275 ft., E-facing slope, rhyolite, 4 Dec. 1959, *Wiggins, Carter & Ernst* 270 (holotype, UC 1303223, photograph at F—neg. no. 58288; isotypes, DS, US). Figure 1: d–f.

Euphorbia heterophylla L. var. *eriocarpa* Millsp., Proc. Calif. Acad. Sci., Ser. 2, 2: 230. 1889 non *E. eriocarpa* Bertol., 1839. TYPE: Mexico. Baja California Sur: Comondú, 21 Mar. 1889, *Brandegge* 26 (holotype, F), *Brandegge* s.n. (probable isotype, UC).

Herba annua, erecta. Folia alternata vel opposita, inferiora saepe fugacia; petiolus gracilis; lamina ovata vel elliptica, raro parum lobata, rare pubescens vel glabrata, grosse dentata, sinuata, vel serrata; stipulae glanduliformes. Cyathia dense puberula; glandulae 4, aliquantum alveiformia; appendices glandularum valde minutae, integrae vel crenatae; flores masculos 10–15; bracteolae obsoletae; styli 3, profunde furcati, basi liberi, vix divergentes. Capsula exserta, dense puberula; semina ovoidea-angulata, grosse tuberculata, ecarunculata.

Erect taprooted annual, 2–6 dm high. Stem terete, glabrous, with scattered short hairs, or minutely puberulent near the nodes, faintly glaucous, 1–4 mm diam. at base. Leaves alternate or opposite, often varying even on a single plant, often fugacious below the inflorescence; petioles slender, 5–40 mm long, puberulent to glabrate, shallowly canaliculate; blade ovate or elliptic, rarely with a few shallow lobes, 1–10 cm long, 0.5–7.5 cm wide, 1.2–4.5 times as long as wide, thinly appressed-pubescent to glabrate above and below, the hairs to 0.5 mm long; base acute to broadly cuneate; apex obtuse, acute, or scarcely short-cuspidate; margin coarsely dentate to shallowly sinuate or serrate, rarely subentire; stipules glanduliform, 0.2–0.4 mm long. Inflorescence a terminal cyme, the bracts similar to the stem leaves. Cyathia campanulate, 0.9–1.5 mm high, 0.9–1.3 mm diam. at orifice, green, densely puberulent; lobes 5, deltate, ca. 0.5 mm long; glands 4, stalked, reniform, green, somewhat creased longitudinally, ca. 0.5 mm long parallel to the

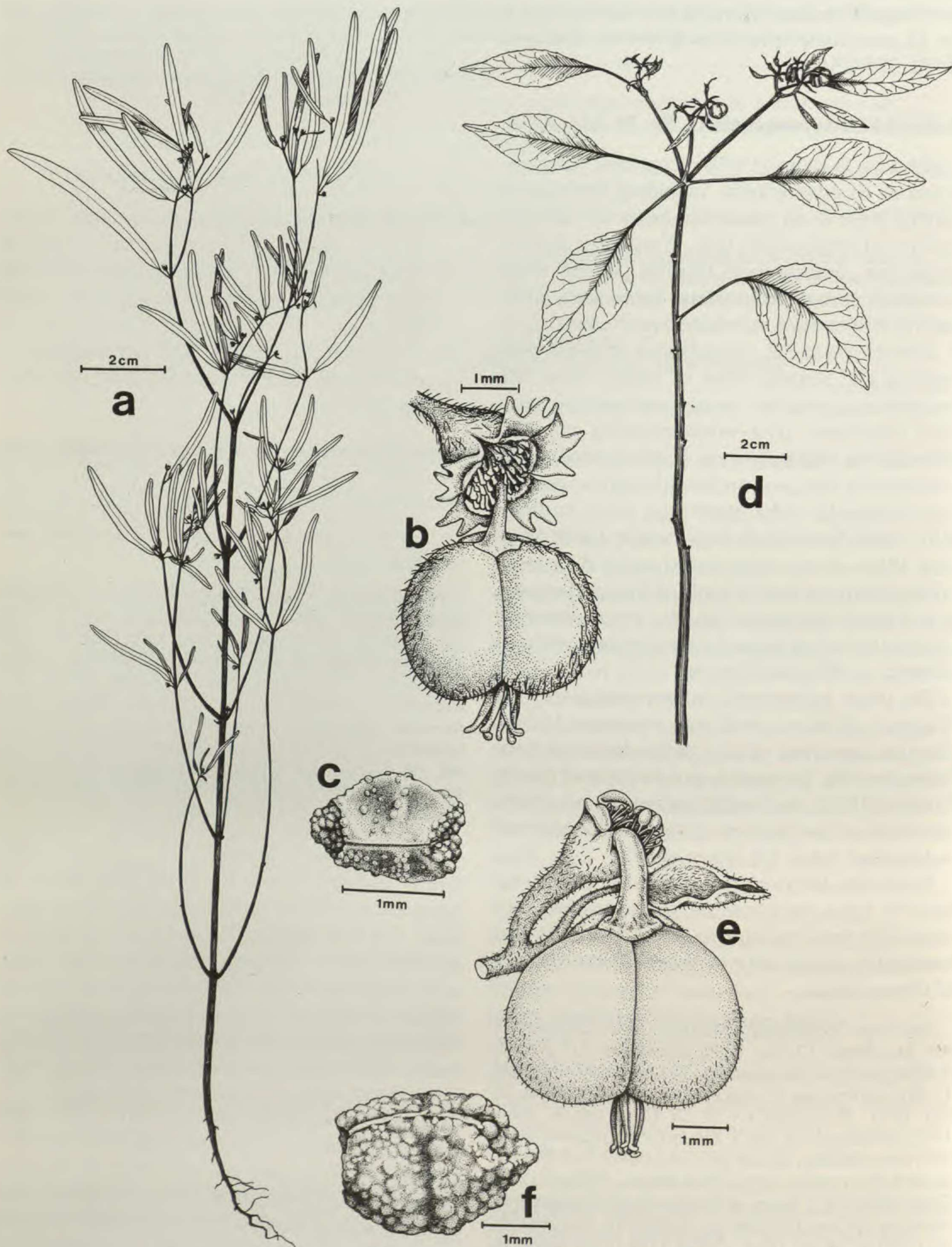


FIGURE 1. a-c. *Euphorbia lagunensis* Huft. — a. Habit, Jones 27509. — b. Cyathium and mature capsule, Jones 27509. — c. Seed, Brandegees 12. d-f. *Euphorbia chersonesa* Huft. — d. Habit, Moran 18927. — e. Cyathium and mature capsule, Wiggins et al. 270. — f. Seed, Wiggins et al. 270.

rim of the cyathium, 0.1–0.2 mm wide; appendages forming a minute rim around the gland, entire or crenate. *Staminate* flowers 10–15; bracteoles obsolete. *Styles* 3, 0.6–0.9 mm long, free to the base, divided nearly their entire length, only slightly divergent; stigmas capitate; gynophore glabrous or sparsely pilose, exerted from the cyathium 1.5–3 mm, nutant. *Capsule* depressed-globose, strongly 3-lobed, 3–3.5 mm high, 4–6 mm diam., densely puberulent; seeds ovoid-angular, 3–3.5 mm long, 1.8–2.2 mm in diameter, light gray to brown, coarsely tuberculate, the tubercles white-tipped, ecarunculate.

This distinctive species is certainly not a member of subg. *Poinsettia*, much less is it related to *E. heterophylla*, as is clear from the flat or somewhat creased, rather than bilabiate or cup-shaped, glands, and the presence of petaloid appendages. The presence of glanduliform stipules and minute appendages dictates its placement in subg. *Agaloma*, where it would seem most at home in sect. *Cyttarospermum* Boiss., based on the annual habit, slender petioles, absence of bracteoles between the staminate flowers, and styles that are deeply bifid and free to the base. The sectional classification of subg. *Agaloma*, however, is in great need of revision (Johnston, 1974; Buck & Huft, 1977), so its placement here must be provisional. *Euphorbia chersonesa* does not seem to have any close relatives and can be easily distinguished from other species of sect. *Cyttarospermum* by the densely puberulent cyathium and capsule, the nearly obsolete appendages of the cyathial glands, the short, erect styles, and the coarsely tuberculate seeds that are not pitted.

Euphorbia chersonesa is apparently restricted to the southern quarter of the Baja California peninsula. Only two of the collections provide elevational data (275 m, 940 m), and little ecological data is available. *Gentry 4096* was collected in "moist soil in shade of basaltic cliffs," and the associates of *Wiggins et al. 270* include "*Lysiloma candida*, *Ruellia*, *Colubrina glabra* [= *C. viridis*], *Aeschynomene*, *Olneya tesota*, and *Bursera microphylla*."

Additional specimens examined. MEXICO. BAJA CALIFORNIA SUR: Sierra de Laguna, 26 Jan. 1890, *Brandege 8* (UC); Rancho Salada, 16 Jan. 1890, *Brandege 9* (F, UC); San José del Cabo, 2–4 Oct. 1890, *Brandege 517* (DS, GH, UC; 2 other sheets of this number, collected on 13 Oct. 1890, are *E. heterophylla*); Comondú, 5 Dec. 1938, *H. S. Gentry 4096* (DS); Sierra de la Giganta, N ridge of Cerro Mechudo, 24°48'N, 110°43'W, ca. 940 m, 3 Nov. 1971, *Moran 18927* (UC).

5. *Euphorbia humayensis* Brandege, *Zoe* 5: 208. 1905. TYPE: Mexico. Sinaloa: Culiacán, 1 Oct. 1904, *Brandege s.n.* (lectotype, UC 110009, here designated, photographs at F—neg. no. 58287 and MICH; isolectotype, F 196158).

This species was not included in Wiggins (1980), even though one collection from the Cape region of Baja California was cited by Brandege in the protologue, and two additional collections by Brandege from Baja California are deposited in the herbarium of the University of California at Berkeley. The species is otherwise known from tropical deciduous forest and thorn scrub in western Mexico, from Sinaloa south to Michoacán. Curiously, this species has recently been collected in the savannas of Venezuela (Guárico, 10 km NWN of Altagracia de Orituco along highway to Caucagua, 18 Nov. 1973, *Davidse 4171*, MO, distributed as *E. ocymoidea* L. vel sp. aff.). This and *E. chersonesa* are the only representatives in Baja California of sect. *Cyttarospermum*, a group of some 35–40 species that reaches its greatest development in western Mexico.

Additional specimens examined. MEXICO. BAJA CALIFORNIA SUR: W side of Cape region, Nov. 1902, *Brandege s.n.* (UC); Todos Santos (Cape region), 4 Oct. 1899, *Brandege s.n.* (UC); Sierra de Laguna, 21 Jan. 1890, *Brandege 10* (F, UC), distributed as *Phyllanthus* sp.

6. *Euphorbia eriantha* Benth., *Bot. Voy. Sulphur* 51. 1844.

Poinsettia eriantha (Benth.) Rose & Standley, *Contr. U.S. Natl. Herb.* 16: 13. 1912.

The presence of five flat or convex cyathial glands, distinct petaloid appendages, and carunculate seeds requires that this species be placed in subg. *Agaloma*, as pointed out by Dressler (1961), and not in subg. *Poinsettia*, where Wiggins (1980) placed it. It belongs to sect. *Zygo-phylidium* Boiss. where its closest relatives are *E. lacera* Boiss. of central Mexico and *E. jalis-censis* Robins. & Greenm. of western Mexico.

7. *Euphorbia lagunensis* Huft, sp. nov. TYPE: Mexico. Baja California Sur: The Laguna, Laguna Mountains, 22 Sept. 1930, *M. E. Jones 27509* (holotype, MO 1034346, photograph at F—neg. no. 58290). Figure 1: a–c.

Species haec ab *E. bilobata* Engelm. glandulae cyathii haud lobatis, appendicibus viridibus 2–4 lobatis, semine luteo-pustulato differt.

Erect taprooted *annual*, 1.5–3.5 dm high. *Stem* glabrous or with a few hairs at the nodes, (0.8–)1–2 mm diam. at base; nodes 3–4 below the inflorescence; internodes (1.5–)2.5–5 cm long. *Leaves* opposite, the lower ones fugacious; petioles (2–)3–8 mm long, appressed-pubescent; blade linear, 18–43 mm long, 1.8–5 mm wide, 7–12(–18) times as long as wide, sparsely to moderately appressed-pubescent above and below, the hairs to 0.5 mm long; base cuneate; apex obtuse; margin entire; stipules glanduliform, minute, less than 0.1 mm long. *Inflorescence* a terminal cyme, the bracts similar to the stem leaves, the cyathia thus appearing solitary in the forks. *Cyathia* campanulate, green, villous to pilose, 0.7–0.9 mm high, 0.8–0.9 mm diam. below the glands, 1.2–1.5 mm across the appendages; lobes 5, erose, 0.3–0.4 mm long, 0.4–0.5 mm wide; glands 4, green, reniform, 0.6–0.8 mm long parallel to the rim of the cyathium, ca. 0.3 mm wide; appendages green, (2–)3–4-lobed (rarely merely crenate), exceeding the gland by 0.3–0.5 mm; gynophore glabrous, exerted from the cyathium 0.3–1 mm, erect or nutant. *Staminate* flowers ca. 15. *Styles* 3, ca. 0.7 mm long, free to the base, nearly erect or only slightly divergent, divided nearly their entire length. *Capsule* subglobose, 1.7–2.2 mm high, 2–2.2 mm diam., densely white-tomentose on the angles, otherwise glabrous; seeds ovoid-angular, 1.4–1.5 mm long, 0.8–0.9 mm diam., with 2 transverse ridges, grayish to brown, covered with yellow pustules, ecarunculate.

This species belongs to sect. *Zygophyllidium*, a group of ten species of the United States and Mexico that is characterized by an annual habit, opposite leaves, and tuberculate seeds. Its closest relative is *E. bilobata* Engelm. of extreme western Texas, southern New Mexico, and southeastern Arizona, but it differs from that species in its entire, rather than deeply bilobed, glands, appendages that are green and 2–4 lobate, rather than white and completely divided, and seeds that are yellow-pustulate, rather than bluntly and sparingly tuberculate. Most of the specimens of *E. lagunensis* were identified and distributed as *E. bilobata* and were found under that name in several herbaria. *Hammerly 387A* is cited as *E. cfr. bilobata* in Johnson (1958), but the species is not included under any name in Wiggins (1980).

Euphorbia lagunensis is apparently confined to high elevations of the Sierra de Laguna and Sierra de San Francisquito, where it occurs on rocky banks and in canyons, or in open grassy

meadows (cf. descriptions of collecting localities in Jones, 1935: 93–94, Goldman, 1951: 59–61, and Johnson, 1958: 246–249, as well as a photo of the meadow at Sierra de Laguna in Johnson, 1958: 235).

Additional specimens examined. MEXICO. BAJA CALIFORNIA SUR: Sierra de Laguna, 23 Jan. 1890, *Brandege 12* (F, UC); Sierra de San Francisquito, 14 Oct. 1890, *Brandege s.n.* (F); Saucito, 14 Oct. 1893, *Brandege s.n.* (UC); El Taste, 14 Sept. 1893, *Brandege s.n.* (US); El Taste, Nov. 1902, *Brandege s.n.* (UC); *Quercus devia-Pinus cembroides* association, canyon W of cabin, La Laguna, Sierra de Laguna, E of Todos Santos, 1,700 m, 24 Dec. 1947, *Carter et al. 2309* (MO, duplicates to be distributed to K, MEXU, MICH, UC, US); from San Jorge to San Francisquito and La Chuparosa, E side of Sierra de la Victoria, "Rancho Encenoso," headwaters of Arroyo de San Francisquito, 23°29'–31'N, 109°47'–55'W, 12 Apr. 1955, *Carter & Ferris 3343-A* (DS); shady, rocky bank above stream near the meadow on Sierra de la Laguna, ca. 5,000 ft., 13 Oct. 1941, *Hammerly 387A* (CAS); Laguna Mts., 2 Mar. 1928, *Jones 24513* (NY).

8. *Euphorbia ceroderma* I. M. Johnston, Proc. Calif. Acad. Sci., Ser. 4, 12: 1066. 1924. TYPE: Mexico. Sonora: San Pedro Bay, 7 July 1921, *Johnston 4304* (holotype, CAS, photograph at F—neg. no. 57898).

This distinctive species is here reported from Baja California for the first time. It is known only from the collections in Baja California cited below and from San Pedro and San Carlos Bays near Guaymas, Sonora, where, according to the protologue, it is abundant.

Euphorbia ceroderma belongs to sect. *Trichosterigma* (Kl. & Gke.) Boiss., where its two closest relatives are *E. antisiphilitica* Zucc. of the Chihuahuan Desert region and *E. rossiana* Pax of the Tehuacán Valley area of Puebla and Oaxaca, Mexico. These three species are remarkable in their peculiar habit of forming dense clumps of erect, leafless, yellow-green stems. *Euphorbia antisiphilitica* has by far the greatest range of the three and is much more widely known, as it is a characteristic component of the Chihuahuan Desert flora and is the source of a widely used wax (Hodge & Sineath, 1956). The three species may be separated by means of the following key.

1. Cyathia 0.7–1 mm high; appendages acute, entire; bracts 10–20 mm long, whip-like *E. ceroderma*
1. Cyathia 2–3 mm high; appendages rounded or erose; bracts 1–2 mm long.
 2. Appendages entire, rounded; cyathia 1–3

- per glomerule; bracts linear to linear-lanceolate, entire *E. antisyphilitica*
2. Appendages conspicuously erose or irregularly dentate; cyathia 3–8 per glomerule; bracts broader, fimbriate *E. rossiana*

In the protologue, Johnston distinguished *E. ceroderma* from *E. antisyphilitica* by the wax-coated stems and much smaller glabrous cyathia of the former, but of these characters, only the size of the cyathia holds up. All three species in this group have wax-coated stems, the heaviness of which apparently varies with the season, and the cyathia of *E. ceroderma* are not glabrous, but are puberulent, although not quite as densely so as in the other two species.

Additional specimens examined. MEXICO. BAJA CALIFORNIA SUR: Sierra de la Giganta, vic. of Rancho San Ignacio, Arroyo Santo Domingo, ca. 12 km E of Santo Domingo jct., 25°38'N, 111°37'W, ca. 200 m, 11 Nov. 1962, *Carter 4452* (SD, UC); Sierra de la Giganta, Arroyo Santo Domingo, ca. 24 km SSW of San Javier, ca. 25°41'N, 111°35'W, ca. 200 m, 14 Oct. 1964, *Carter 4736* (MICH, MO, UC), 26 Oct. 1964, *Carter 4872* (UC), 1 June 1965, *Carter & Sharsmith 4928* (MICH, UC); Sierra de la Giganta, Arroyo Santo Domingo, ca. 34 km SSW of San Javier, 25°38'N, 111°37'W, ca. 200 m, 1 June 1965, *Carter 4928A* (MICH, UC); Arroyo Purísima, above Purísima, 31 Mar. 1951, *H. S. Gentry 10307* (MICH); 3 mi. N of San Juanico, near 26°16'N, 112°29'W, ca. 80 m, 14 Feb. 1973, *Moran & Reveal 20100* (SD); Magdalena Plain, 2 mi. S of Pozo Grande, near 25°43'N, 112°01'W, ca. 10 m, *Moran 21364* (SD).

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